



## Percent Impervious Area within 1 Square Kilometer

This EnviroAtlas community map illustrates the percent of each square kilometer within the community area that is covered by impervious surfaces. It is not summarized by census block group. Impervious surfaces are materials, including buildings, roads, and sidewalks, that do not allow the penetration of water to the soil below.

### Why is impervious area important?

Impervious surfaces prevent rainwater from entering the soil and force it to flow along the surface until it finds a place to drain. Allowing rain to penetrate the earth recharges groundwater sources, regulates the volume of water in streams and rivers, and filters pollutants. As impervious surface increases, rainwater runoff increases in quantity, speed, temperature, and pollutant load. This runoff can increase the potential for flooding and the transportation of sediment, nutrients, and pollutants. It can also raise the temperature of the receiving water body.

These factors can significantly reduce water quality downstream, affecting neighboring towns and communities, as well as aquatic wildlife that depend on upstream water sources. Reduced water quality creates public health concerns and can generate additional water treatment expenses for the community. Poor water quality can also affect biodiversity, recreational opportunities, and potential development of certain industries that depend on water quality, such as agriculture, tourism, or fishing.

Impervious surfaces affect the quantity as well as the quality of water supply resources. Rainwater entering the soil recharges groundwater aquifers. Water also percolates more slowly through the soil to enter streams and rivers, contributing to base flows and regulating stream flow after precipitation events. Impervious surfaces do not allow this [recharge](#), thus contributing to potential insufficiencies in water supply for both ground and surface water resources.

In addition to the impacts on water quality, impervious surfaces have been associated with increases in [ambient](#) temperatures. Referred to as the [urban heat island](#) effect, research has found that impervious surface materials store heat during the day and slowly release it at night, preventing the area and its residents from cooling down after a hot day. This effect is amplified in urban areas where impervious surfaces cover a greater percentage of land than in rural communities. Elevated daytime and especially nighttime



temperatures can amplify the effects of heat waves and increase the incidence of heat stroke and other heat-related health effects. Higher ambient temperatures also contribute to the chemical reactions that produce ground-level ozone and smog that threaten public health. Children, the elderly, and people with certain pre-existing health conditions are particularly vulnerable to these impacts related to impervious surface.

### How can I use this information?

This map, Percent Impervious Area within 1 Square Kilometer, can be used by citizens, planners, and public health professionals to identify neighborhoods that are more vulnerable to the problems associated with impervious surfaces. Interventions can then be targeted to these locations, including the selective replacement of existing impervious surface with natural vegetation, semi-permeable pavement, or construction material that reflects rather than stores heat.

By increasing the transparency of this map layer in the interactive map, users can view this information along with additional layers, such as riparian buffers and streams and waterbodies (NHDPlus, found under the boundaries icon), to identify possible sources of impairments and remediation needs. Sets of maps illustrating land area, tree cover, vegetated cover, and impervious area may be found for 15 and 50 meter stream and lake buffers for each community in EnviroAtlas. This map could also be combined with layers on recreation or domestic water consumption to show how impairments relate to water use.

## How were the data for this map created?

This map is based on [land cover](#) data derived for each EnviroAtlas community. The land cover data was created from one-meter aerial photography through remote-sensing methods. Land cover considered impervious surface includes roads, buildings, and all paved surfaces; it excludes all vegetated land, barren land, and water.

## What are the limitations of these data?

All of the EnviroAtlas community maps that are based on land cover use remotely-sensed data. Remotely-sensed data in EnviroAtlas have been derived from imagery and have not been verified. These data are estimates and are inherently imperfect. The land cover maps used in the community component of EnviroAtlas typically have an overall accuracy of between 80 and 90 percent. This level of accuracy means that there is a probability of at least 80 percent that the land cover reported at any given point on the map is correct.

The land cover maps will be updated over time; updates may improve accuracy as data and classification methods improve. This map is not meant to be used for inferring numbers or types of residents at risk for developing specific health conditions.

## How can I access these data?

EnviroAtlas data can be viewed in the interactive map, accessed through web services, or downloaded. The dataset

used to calculate the impairment counts, which provides greater detail on specific water bodies and the causes and sources of impairment, can be found at EPA's [WATERS Geospatial Data Downloads](#).

## Where can I get more information?

Other background layers are available, such as community land cover maps created for EnviroAtlas at 1-meter resolution (enter *land cover community* in the interactive map search box) and community boundaries (under the boundaries icon). A selection of resources on water quality and impairment is listed below. Information on [section 303\(d\)](#) of the Clean Water Act is available from EPA's Office of Water. For additional information on the data creation process, access the [metadata](#) found in the layer list drop-down menu for map layers in the EnviroAtlas interactive map. To ask specific questions about these data, please contact the [EnviroAtlas Team](#).

## Acknowledgments

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## Selected Publications

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